FINAL
ENGINEERING EVALUATION/COST ANALYSIS (EE/CA)
LAND USE CONTROLS

FORT BLISS, TX

MILITARY MUNITIONS RESPONSE PROGRAM

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Prepared for

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LIST OF ACRONYMS AND ABBREVIATIONS

AEDB-R	Army Environmental Database-Restoration
AM	Action Memorandum
AR	Army Regulation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COCs	Constituents of Concern
CSM	Conceptual Site Model
CTT	Closed, Transferring, and Transferred
CWM	Chemical Warfare Materiel
DERP	Defense Environmental Restoration Program
DHS	Department of Homeland Security
DMM	Discarded Military Munitions
DoD	Department of Defense
EE/CA	Engineering Evaluation/Cost Analysis
EHE	Explosive Hazard Evaluation
EM	Engineering Manual
EOD	Explosive Ordnance Disposal
FS	Feasibility Study
FY	Fiscal Year
HHE	Health Hazard Evaluation
IC	Institutional Control
IMCOM	Installation Management Command
IRP	Installation Restoration Program
LUC	Land Use Control
LUCP	Land Use Control Plan
LUR	Land Use Restriction
MC	Munitions constituents
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
MMRP	Military Munitions Response Program
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
NCP	National Contingency Plan
NPL	National Priorities List
NPV	Net present value
NTCRA	Non-Time Critical Removal Action
O&M	Operations and maintenance
ODUSD(ES)	Office of the Deputy Under Secretary of Defense (Environmental Security)

OE	Ordnance and explosives (terminology replaced by "MEC")
OSWER	Office of Solid Waste and Emergency Response
PA	Preliminary Assessment
RACER	Remedial Action Cost Engineering and Requirements (*cost estimating software program*)
RDX	Cyclotrimethylenetrinitramine
REC	Record of Environmental Consideration
RI	Remedial Investigation
ROD	Record of Decision
SI	Site Inspection
TCEQ	Texas Commission on Environmental Quality
TNT	Trinitrotoluene
TPP	Technical Project Planning
U.S.	United States
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Command
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
UXO	Unexploded Ordnance

GLOSSARY OF TERMS

Closed Range – A military range that has been taken out of service as a range and that either has been put to new uses that are incompatible with range activities, or is not considered by the military to be a potential range area. A closed range is still under the control of a Department of Defense (DoD) component.

Defense Site – All locations that were owned by, leased to, or otherwise possessed or used by the DoD. The term does not include any operational range, operating storage or manufacturing facility, or facility that is used or was permitted for the treatment or disposal of military munitions.

Discarded Military Munitions (DMM) – Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded explosive ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations. (10 U.S. Code [U.S.C.] 2710(e)(2)).

Engineering Evaluation/Cost Analysis (EE/CA) – An EE/CA is prepared for all non-time-critical removal actions as required by Section 300.415(b)(4)(i) of the National Contingency Plan. The goals of the EE/CA are to identify the extent of a hazard, to identify the objectives of the removal action, and to analyze the various alternatives that may be used to satisfy these objectives for cost, effectiveness, and implementability. (EP 75-1-3; citation taken from EM 1110-1-4009, *Engineering and Design: Military Munitions Response Actions,* [USACE, June 2007]).

Explosive Ordnance Disposal (EOD) – The detection, identification, on-site evaluation, rendering safe, recovery, and final disposal of unexploded ordnance by a military response unit. It may also include explosive ordnance that has become hazardous by damage or deterioration.

Explosives Safety – A condition where operational capability and readiness, personnel, property, and the environment are protected from unacceptable effects of an ammunition or explosives mishap.

Land Use Controls (LUCs) – Physical, legal, or administrative mechanisms that restrict the use of, or limit access to, contaminated property to reduce risk to human health and the environment. Physical mechanisms encompass a variety of engineered remedies to contain or reduce contamination and physical barriers to limit access to property, such as fences or signs. The legal mechanisms are generally the same as those used for institutional controls (ICs) as discussed in the National Contingency Plan. ICs are a subset of LUCs and are primarily legal mechanisms imposed to ensure the continued effectiveness of land use restrictions imposed as part of a remedial decision. Legal mechanisms include restrictive covenants, negative easements, equitable servitudes, and deed notices. Administrative mechanisms include notices, adopted local land use plans and ordinances, construction permitting, or other existing land use management systems that may be used to ensure compliance with use restrictions. ("DoD Management Guidance for the DERP," citation taken from EM 1110-1-4009, *Engineering and Design: Military Munitions Response Actions,* [USACE, June 2007]).

Military Munitions – All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the DoD, the U.S. Coast Guard, the Department of Energy, and the Army National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, except that the term does include non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under 42 U.S.C. 2011 (Atomic Energy Act) have been completed. (10 U.S.C. 2710(e)(3)(A) and (B)).

Military Range – "Active range" and "inactive range" as these terms are defined in 40 CFR §226.201.

Munitions and Explosives of Concern (MEC) – This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks, means unexploded ordnance, DMM, or munitions constituents (e.g., trinitrotoluene [TNT] or cyclotrimethylenetrinitramine [RDX]) present in high enough concentrations to pose an explosive hazard.

Munitions Constituents (MC) – Any materials originating from unexploded ordnance, DMM, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions (10 U.S.C. 2710).

Munitions Debris (MD) – Remnants of munitions (e.g. fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal.

Non-Time Critical Removal Actions – Actions initiated in response to a release or threat of a release that poses a risk to human health, its welfare, or the environment. Initiation of removal cleanup actions may be delayed for 6 months or more (EP 1110-1-24, USACE, 2000).

Operational Range – A range that is under jurisdiction, custody, or control of the Secretary of Defense and that is used for range activities or, although not currently being used for range activities, is still considered by the Secretary to be a range and has not been put to new use incompatible with range activities. (10 U.S.C. 101(e)(3)(A) and (B)). Also includes "military range," "active range," and "inactive range" as those terms are defined in 40 CFR 266.201.

Other than Operational Range – Includes all property under jurisdiction, custody, or control of the Secretary of Defense that is not defined as an Operational Range.

Range – A designated land or water area that is set aside, managed, and used for DoD range activities such as:

(A) Firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, impact areas, electronic scoring sites, buffer zones with restricted access, and exclusionary areas.

(B) Airspace areas designated for military use in accordance with regulations and procedures prescribed by the Administrator of the Federal Aviation Administration (10 U.S.C. 101(e)(5)).

Removal Action – The cleanup or removal of released hazardous substances from the environment. Such actions may be taken in the event of the threat of release of hazardous substances into the environment and/or may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances, the disposal of removed material, or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release. In addition, the term includes, but is not limited to, security fencing or other measures to limit access, provision of alternative water supplies, temporary evacuation and housing of threatened individuals not otherwise provided for, action taken under Section 9604(b) of this title, and any emergency assistance that may be provided under the Disaster Relief and Emergency Assistance Act [42 U.S.C. 5121 et seq.] The requirements for removal actions are addressed in 40 CFR §§300.410 and 330.415. The three types of removal are emergency, time-critical, and non-time-critical removals. ("DoD Management Guidance for the DERP," citation taken from EM 1110-1-4009, *Engineering and Design: Military Munitions Response Actions*, [USACE, June 2007]).

Time-Critical Removal Action – A response to a release or threat of release that poses such a risk to public health (serious injury or death), or the environment, that clean up or stabilization actions must be initiated within 6 months.

Unexploded Ordnance (UXO) – UXO are military munitions that:

(A) Have been primed, fused, armed, or otherwise prepared for action.

(B) Have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or materiel.

(C) Remain unexploded, whether by malfunction, design, or any other cause. (10 U.S.C. 101(e)(5)).

EXECUTIVE SUMMARY

The Army is establishing land use controls (LUCs) at installations within the Military Munitions Response Program (MMRP) to protect humans from potential hazards at Munitions Response Sites (MRSs) as an interim action while the sites progress to a final remedy. The MMRP addresses Munitions and Explosives of Concern (MEC) and Munitions Constituents (MC) within the framework of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, 42 U.S.C. §§. 9601 et seq.). The LUCs considered under this phase of the MMRP are interim or non-time critical removal actions (NTCRA) that are required because the conditions at the site support a NTCRA according to 40 CFR 300.415(b)(2), including but not limited to the threat of fire or explosion.

Fort Bliss is conducting its MMRP and has one on-post MRS where further actions are pending, as documented in the *Final Site Inspection Report Fort Bliss, TX* (USACE, 2007). This MRS is eligible for LUCs as an interim action while the CERCLA responses continue.

This Engineering Evaluation/Cost Analysis (EE/CA) is a required step (along with an Action Memorandum [AM] and public involvement activities) in implementing the LUCs as a NTCRA at Fort Bliss. This is a streamlined EE/CA that summarizes MRS information and comparatively evaluates LUCs against a No Action alternative. The EE/CA has a focused purpose and is not intended to result in a final remedy at Fort Bliss. Fort Bliss is at the Remedial Investigation (RI)/Feasibility Study (FS) stage, which is pending completion of a Wide Area Assessment being conducted by URS. A final remedy selection is anticipated during the fiscal year 2017, and therefore will be planning for a five year interim NTCRA.

Following the preparation of this EE/CA, the Army will prepare an AM and finalize a Land Use Control Plan (LUCP) to guide the implementation of LUCs as a NTCRA.

E.1 AGENCIES INVOLVED

The U.S. Army is the executing agency for the MMRP. The U.S. Environmental Protection Agency (USEPA) and the Texas Commission on Environmental Quality (TCEQ) are regulatory agency stakeholders for Fort Bliss. The installation is not on the National Priorities List (NPL), and DoD operates as the lead agency under CERCLA. The installation is not operating under a Federal Facility Agreement with the USEPA.

E.2 DESCRIPTION OF MRS

The two independent *Closed, Transferring and Transferred (CTT) Range Inventory Report for* Fort Bliss (TechLaw, Inc. 2002; e^2M 2003) first identified six MRSs at Fort Bliss and determined two of these were eligible for the MMRP based on preliminary information. A detailed review of the MRSs was made in the *Final Site Inspection Report Fort Bliss, TX* (USACE, 2007), and it was determined that only one of the two MRSs was eligible for the MMRP, since the other one overlapped operational range area. Therefore, the Castner Range MRS is the only one addressed by this EE/CA. The *SI* is the basis for the site history provided in this report and in Table ES-1.

Table ES-1: On-Post MRS at Fort Bliss

MRS Name	AEDB-R No.	Acres [(1)]	MEC Present?	MC Present?	MRSPP Score
Castner Range	FTBL-004-R-01	7,007	Yes	Yes	3

AEDB-R – Army Environmental Database - Restoration
MRSPP – Military Response Site Prioritization Protocol
Note: (1) The acreage of Castner Range was reported to have several discrepancies throughout the CTT report; the given acreage is an estimate based on georeferenced data, and subject to revision based on analysis of official geospatial files.

The LUCs are intended to limit the risk posed by the MEC and MC at this MRS while the following further investigation and response actions are being implemented under CERCLA:

- RI/FS (Remedial Investigation/Feasibility Study)
- Record of Decision (ROD), Remedial Action

E.3 REMOVAL ACTION OBJECTIVE

The objective of the NTCRA is to protect human health by minimizing exposure to MEC and MC, including (but not limited to) the potential for fire and explosion at the MRS while further response actions at the sites are evaluated and implemented.

E.4 EVALUATION OF ALTERNATIVES

This EE/CA is focused on two alternatives—No Action and LUCs—for addressing the risks of the on-post MRS during the interim while the MMRP progresses and more permanent actions are investigated and implemented. The No Action alternative assumes that no additional steps will be taken to mitigate, monitor, or document the potential risks, though it does not remove existing controls at the Castner Range MRS. The LUCs alternative considered for Fort Bliss involves a combination of Institutional Controls (ICs, including land use restrictions, notations in the Installation Master Plan, and dig permits) and Engineering Controls (including signs, markers, fences, and guards). These measures are considered and applied to the sole MRS at Fort Bliss and changed as necessary to address site-specific details. The LUCs alternative evaluated for this EE/CA is the combined set of LUCs proposed for the Castner Range MRS.

In this NTCRA, the No Action and LUCs alternatives are evaluated against the CERCLA criteria of effectiveness, implementability, and cost.

The EE/CA evaluation determined that the LUCs alternative at Fort Bliss could be implemented and would effectively meet the removal action objective.

E.5 RESIDUAL RISK MANAGEMENT

The LUCs will reduce the probability of direct contact with the MEC or MC, and will thus reduce the exposure and explosive risk to humans at the MRS.

However, no action will be taken with this NTCRA to remove or remediate the MEC and MC at the Castner Range MRS at Fort Bliss. Therefore, residual risk from the MEC and MC will

remain on site. The LUCs alternative is a NTCRA and is not intended to be permanent or to replace the need for the more permanent solutions developed under the MMRP.

E.6 COSTS OF NO ACTION AND LUCs ALTERNATIVES

The cost estimates for the LUCs alternative at Fort Bliss were developed as shown in Appendix B. The cost summaries for the No Action and LUCs alternatives are shown in Table ES-2. As shown in Table ES-2, the No Action alternative will incur no additional cost because no action, reviews, or other activities are conducted. NTCRA LUCs will incur capital and operating costs in the short term while the full response action is developed and implemented for the single MRS in the MMRP at Fort Bliss.

Table ES-2: Cost Summary of NTCRA Alternatives (*cost in $1,000s*)

Alternative	MRS	Area *(Acres)*	Capital Cost	Annual Operating Cost	O&M Years	Present Value
Alternative 1 - No Action	Castner Range	7,007	$ 0	$ 0	NA	$ 0
Alternative 2 - LUCs			$ 2,674.8	$ 343.1	5	$ 3,957.7

Note: A 5-year period with a 2.75% discount rate is used for economic projections
NA – not applicable
O&M – operations and maintenance

The NTCRA LUC cost estimates cover new requirements and have not yet been incorporated into the Installation Action Plan, the outyear budget, or the Army Environmental Database - Restoration (AEDB-R) program. They are of a form and detail that should allow their incorporation, though that will be done after completing this EE/CA.

E.7 RECOMMENDED ALTERNATIVE

Alternative 1, No Action, is not capable of meeting the removal action objective of protecting human health from exposure to potential MEC and MC. LUCs (Alternative 2) is capable of meeting this objective, is feasible to implement, and incurs a reasonable cost beyond that of No Action. On the basis of this evaluation, it is recommended that the LUCs alternative be implemented at the single Fort Bliss MRS, Castner Range.

1.0 OVERVIEW

1.1 REGULATORY FRAMEWORK/AUTHORIZATION

The Military Munitions Response Program (MMRP) is conducted under the Defense Environmental Restoration Program (DERP) to address Department of Defense (DoD) sites with unexploded ordnance (UXO), discarded military munitions (DMM), and munitions constituents (MC) located on current and former military installations. In general, the MMRP follows the process established for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; 42 U.S.C. §§. 9601 et seq.).

The Army began performing MMRP site inspections (SIs) in Fiscal Year 2003 (FY2003) and completed them nationwide by the end of FY2010. For various reasons, it may be years before most of the sites proceed beyond the SI. Due to the potential hazards posed by the possible presence of Munitions and Explosives of Concern (MEC), which includes UXO, DMM, and MC in sufficiently high concentrations to pose an explosive hazard, there is the potential for harm if appropriate controls are not maintained. Both the CERCLA (42 U.S.C. §§. 9601 et seq.) and the DoD Ammunition and Explosives Safety Standards (DoD 6055.09) require the Army to prohibit unnecessary access to such sites and take appropriate actions to reduce the threat to public health or welfare.

To address the explosive hazards and the risks from MEC and MC at active installations and to meet the requirements in the *FY2010 Program Management Plan for the Active Sites Cleanup Program*, the U.S. Army Environmental Command (USAEC) is assisting installations in preparing and implementing Land Use Controls (LUCs) for their munitions response sites (MRSs). Only Army-owned MRSs that are recommended for further action beyond the SI phase are included in this requirement. Sites with a no further action recommendation and MRSs located off Army-owned land will not be addressed in this action, although they are still being addressed as appropriate under the MMRP.

LUCs are considered a CERCLA response action, and as such, they must be applied via either a removal action (i.e., a non-time critical removal action [NTCRA]) or a remedial action. Because these LUCs are an interim action (not a final action) for the MRS, a NTCRA is the appropriate mechanism for implementation. A NTCRA requires the preparation and coordination with stakeholders for an Engineering Evaluation/Cost Analysis (EE/CA) and an Action Memorandum (AM), along with the required public involvement actions (40 CFR 300.415(b)(4)). This document is the EE/CA for Fort Bliss.

1.2 INSTALLATION DESCRIPTION

Fort Bliss straddles the state line of Texas and New Mexico, including property in El Paso County, TX and Dona Ana and Otero counties, NM. It covers approximately 1.2 million acres of land, and the main cantonment area is located next to the city of El Paso (Figure 1-1). This installation operates under the Federal Facility Identification number TX213720101.

The primary objective of Fort Bliss is to maintain a force of trained and ready soldiers who can be rapidly deployed in the case of a crisis. The history of this installation goes back to 1848, when a military post was first established in El Paso during the Mexican War, and has been at its current location since 1893. Since then, Fort Bliss has expanded and contracted frequently,

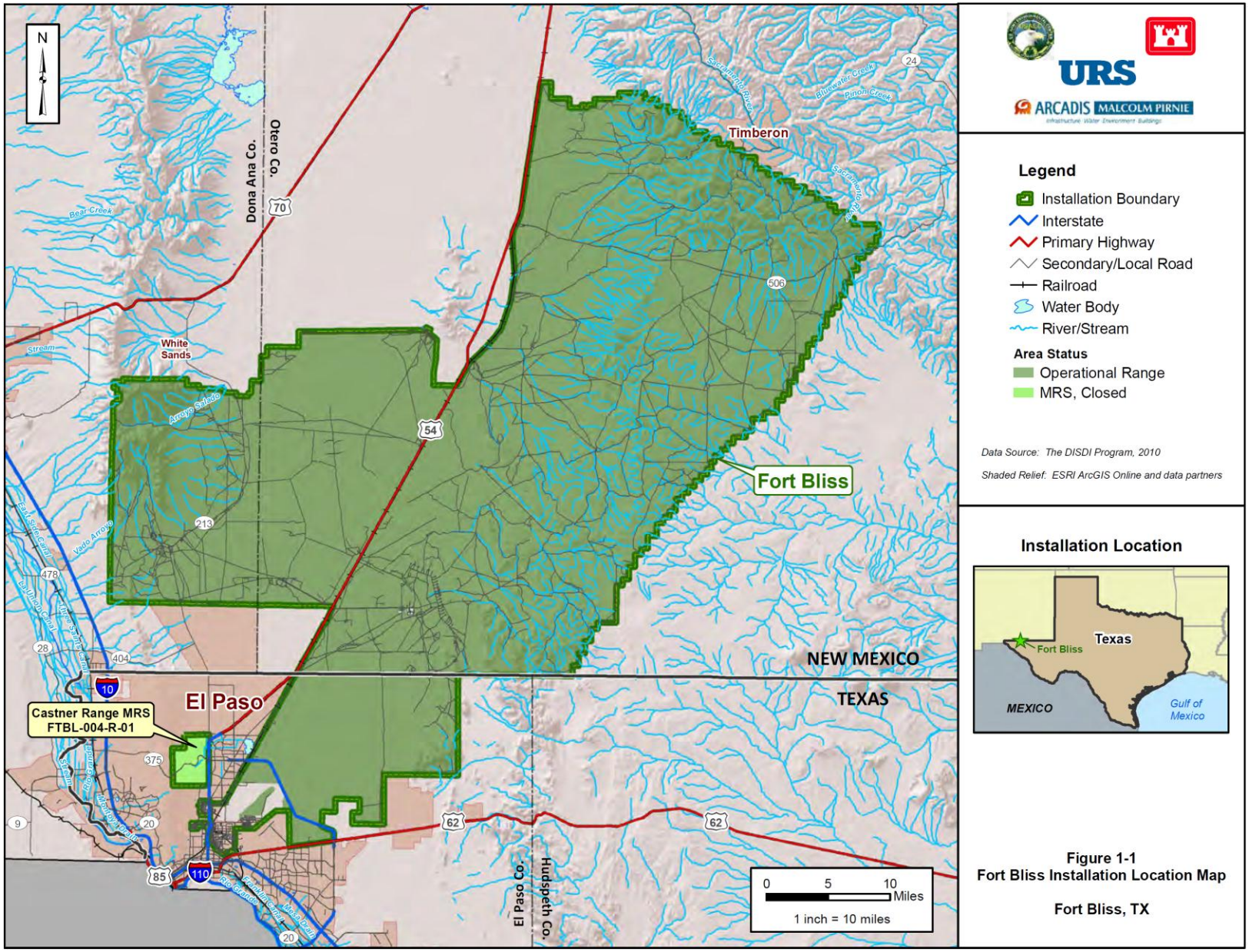

Figure 1-1
Fort Bliss Installation Location Map

Fort Bliss, TX

reaching its peak growth phase just after the turn of the 20th century to defend against the threat posed by Pancho Villa during the Mexican Revolution.

1.3 MMRP INVESTIGATIONS TO DATE

The MMRP SI at Fort Bliss was completed in January 2007. Six MRSs were identified by the *Closed, Transferring and Transferred (CTT) Range Inventory Reports for Fort Bliss* (USACE, 2002, 2003) at the installation, only one of which (Castner Range, FTBL-004-R-01) was determined by the SI to require further action. This MRS is part of Fort Bliss, although it is non-contiguous with the rest of the installation. The SI collected and reviewed reports of MEC, munitions debris, and elevated levels of MC in several locations in this MRS. As a result, it was unnecessary to do further testing at the time of the SI; however, immediate response and further investigation were recommended. Although an EE/CA was initiated in 2007, it was not completed. The immediate response recommended by the 2007 SI was to add fencing and signs around Castner Range. The recommended further characterization would include the performance of an RI/FS on the entire site to support future remedial activities. This RI/FS is in the planning stages, and is pending the completion of a Wide Area Assessment expected to be finished by FY2012. Final remedy selection is anticipated during FY2017.

1.4 PURPOSE AND SCOPE OF EE/CA

The purpose of this EE/CA is to evaluate two alternatives—No Action and LUCs—for the mitigation of potential risks to human health. The evaluation is conducted in accordance with CERCLA and the NCP for NTCRAs and covers the factors of effectiveness, implementability, and cost.

1.5 TECHNICAL PROJECT PLANNING (TPP) PROCESS

The Technical Project Planning (TPP) process[1] has been used to date in the CERCLA activities at Fort Bliss. The TPP will be used for the NTCRA to establish project objectives and communicate with stakeholders. The U.S. Environmental Protection Agency (USEPA) and the Texas Commission on Environmental Quality (TCEQ) are regulatory agency stakeholders for Fort Bliss.

A TPP meeting was held via teleconference on 7 November 2011 to discuss the implementation of the MMRP LUC program at Fort Bliss. Representatives from the United States Army Corps of Engineers (USACE), Fort Bliss, the Texas Commission on Environmental Quality (TCEQ), and URS were included in the meeting. The presentation included a summary of the LUC program, goals, objectives of the effort and a discussion of the schedule and path forward.

1.6 SUMMARY OF PUBLIC PARTICIPATION

This EE/CA is prepared in Draft, Draft Final and Final versions. The Draft EE/CA is for Army-only review. The Draft Final EE/CA is for review by regulatory agencies (the U.S.

[1] The four-phase TPP process is described in *EM 200-1-2 (Engineering Manual 200-1-2: Technical Project Planning Process*, U.S. Army Corps of Engineers [USACE], August 1998). The TPP team involves key decision-makers, including installation representatives, the USACE project manager, regulators, and other stakeholders. Their participation helps define the information needed to make decisions at the MRS, keeps them informed, and allows better buy-in to the process.

Environmental Protection Agency [USEPA], State, and other agencies). The Final EE/CA will incorporate preceding comments and will have Army approval and regulatory stakeholder concurrence.

The Final EE/CA will be made available to the public for their review and comment in accordance with 40 CFR §300.415(n)(2). Public notification of the Final EE/CA will be printed in the local English and Spanish newspapers when the document is ready for public review, with the offer to present the EE/CA and its recommendations at a public meeting. The public meeting will be conducted only if requested during the public comment period. At the end of the 30-day public comment period, public comments on the Final EE/CA will be addressed in the AM under its Section V, "Proposed Actions and Estimated Costs" and in an attached responsiveness summary. The Final EE/CA and AM will become part of the administrative record for the project.

1.7 APPLICABLE REPORTS AND STUDIES

The MRS at Fort Bliss has been identified and inspected in the following reports:

- *Closed, Transferring and Transferred (CTT) Range Inventory Report for Fort Bliss*, USACE, 2003
- *Final Site Inspection Report Fort Bliss, Texas*, USACE, 2007.
- *Closed, Transferring and Transferred (CTT) Range Inventory Report for Fort Bliss*, USACE, 2002

These documents and policy and regulatory guides are listed in Appendix A, References.

2.0 SITE CHARACTERIZATION

The Castner Range MRS has been identified as the only MMRP eligible site at Fort Bliss, and is included in this EE/CA for NTCRA land use control consideration. The location of the Castner Range MRS is shown in Figure 2-1.

2.1 CASTNER RANGE MRS (FTBL-004-R-01)

The Castner Range MRS consists of 7,007 acres. It is adjacent to the city of El Paso, Texas, and is incorporated into El Paso County. It is traversed by the Trans Mountain Road (east-west), which is an important thoroughfare for residents. Utility lines, dams, and stormwater catch basins are present within the boundaries of the range. The terrain of the MRS consists of rugged mountains and canyons on the western side, and foothills working their way down into a gently sloped desert floor in the east. The area is heavily vegetated with desert flora.

The Castner Range, which includes the property comprising the Castner Range MRS was initially acquired in 1926, before it reached its peak size in 1939 at 8,328 acres; it was extensively used until 1966. Before World War II (WWII), there were at least four rifle ranges in the southern portion of the range, and it was also likely used for firepower demonstrations and artillery firing by the U.S. 82nd Field Artillery Regiment. During WWII, three artillery firing points and 17 ranges were located within the MRS, which included: several small arms ranges, a 37mm caliber range, a mortar range, and moving target and field firing courses. The western portion of the range was used as a large artillery impact area during 1930's and 1940's. By 1955, there were 27 ranges present at Castner Range, including a 3.5-inch rocket range, a live hand grenade range, and a demolition range. The remainder were small arms ranges. In 1961, a complex of firing ranges called Trainfire I was located on the eastern edge of the range, and were used for live firing and target detection. Close combat training was conducted in the area known as the Vietnam Village, which covered 20 acres and most likely involved hand grenades, bulk explosives, and explosive booby-traps.

The shift in the mission of Fort Bliss from a combat garrison to become the Air Defense School meant that any type of air defense artillery available before or during WWII may have been used, demonstrated, or disposed of on Castner Range. It is certain that firing demonstrations took place, and probably involved white phosphorous and smoke munitions as well as live ammunition. Although organized weapons firing was discontinued in 1966 when operations moved to the Meyer Range Complex, special explosive operations took place in 1958 and 1976. The former year entailed a blasting and quarrying operation, which was part of the training process for the U.S. 273rd Engineer Detachment; in the latter year, a cratering exercise involved placing M2A3 (15-pound) and M3A4 (40-pound) shaped charges into holes to create excavations.

After several years without use, the U.S. Department of the Army determined in 1971 that the range was excess to its needs and the range was reported excess to the General Services Agency (GSA). Although nearly 1,250 acres were successfully decontaminated and declared excess, the Army was unable to decontaminate the rest, resulting in the inability to obtain a grant of excess for the remainder of Castner Range. Several smaller parcels have since been cleared and are now collectively referred to as the transferred portions of Castner Range. However, as noted above, 7,007 acres still remain in the Castner Range MRS due to the difficulty of UXO removal and MC remediation in this challenging terrain.

Some areas of Castner Range were used for open burning and chemical disposal, although more is known about these as the result of removal actions than from historical documentation. Open Burn/Open Detonation (OB/OD) Pit B-1 is in the northern part of the range, was probably used for the duration of the time that Castner Range was active, and was primarily used for burning small arms munitions. The installation completed a removal action at this site in 2001 due to the presence of metals and explosives indicated by soil testing. OB/OD Area A-1 is in a small valley in the northwest corner of Castner Range. Previous range activities included about 4 acres of the valley floor, and was likely active during the same time as the rest of the range. Pesticide contamination was identified during a site investigation in 2002, and soil remediation activities were conducted during 2006. Lastly, the Trans Mountain Buried Drum Site covers 6 acres north of the Trans Mountain Road. In 1994, empty 55-gallon drums and a large surface flow of tar were discovered by a contractor removing ordnance, resulting in a 1995 Notice of Violation from the Texas Natural Resource Conservation Commission (TNRCC), and a removal action that was completed in 2001. The area's central feature was a pit approximately 230 x 10 x 12 feet wide containing asphaltic tar material; the site also contained concrete slabs, asphalt pavement, piles of concrete and metal debris, drums containing tar-like material, and buried 55-gallon drums.

In addition to the MC removal operations noted above, many organized ordnance investigations have been conducted from 1971 to 2004, most of which have resulted in the discovery of UXO. One of the most recent clearance operations was performed in 2004 by the USAEC through the MMRP. This endeavor covered 1,200 acres; in the process, it identified and detonated more than 380 live UXO and 167 practice rounds (USAEC, 2004).

Based on this history, munitions that may be found in the area include mortars, white phosphorous, smoke rounds, pyrotechnics, illumination flares, grenades, small arms, and large caliber high explosives. This creates the potential for both MEC and MC concerns on the MRS.

Multiple deaths have resulted from the munitions activities in this area. In 1955, three children were killed and ten others were injured from the explosion of 75mm UXO. In 1962, another child was killed by a 2.36-inch rocket detonation; four other children lost one or both legs in this explosion.

Munitions Response Site Prioritization Protocol (MRSPP) Score: The Castner Range MRS has been given an MRSPP score of 3, based on the scores of the Explosive Hazard Evaluation (EHE) and the Health Hazard Evaluation (HHE); there was no known or suspected Chemical Warfare Materiel (CWM) Hazard.

Current and Future Land Use: The MRS is largely undeveloped, with a few exceptions. Current activities include Texas Department of Transportation (TXDOT) maintenance on Trans Mountain Road and a TXDOT maintenance yard; the El Paso Museum of Archaeology, Border Patrol Museum, and Girl Scout Recreation Center; the Department of Homeland Security (DHS) Border Patrol Headquarters; and the Texas Department of Transportation. All of these activities occur on parcels that are officially transferred, and therefore are not part of the MRS, although they still fall within the formal boundary.

Frequent illegal land use includes hiking, biking, rock hounding, plant harvesting, and excavating for Native American cultural artifacts. As a result, the list of potential human receptors is varied: museum personnel and visitors, TXDOT personnel, DHS Border Patrol personnel, authorized Range personnel, authorized Military Police, utility company maintenance personnel, and unauthorized recreational trespassers. Future land use is unknown, and available

options will hinge upon successful remediation and the application of corrective action alternatives.

Existing LUCs: The SI recommended this MRS for immediate action in the form of signs and fences, as well as an MRS specific RI/FS. Current LUCs include fences along the South-Western border of the MRS, and partial fences along the North-Western border of the MRS. As of 2007, there were no fences along the rest of the perimeter of the Castner Range. There are 67 large bilingual and 120 smaller signs in place to alert the public of potential hazards from UXOs. Signage also contains warnings regarding the criminal liabilities associated with trespassing. Old roads into the range have been blocked using large boulders. It is also periodically patrolled by the Military Police stationed at the McGregor range camp, who are responsible for similarly monitoring the entirety of Fort Bliss; patrols occur on an irregular basis.

2.2 STREAMLINED RISK EVALUATION

2.2.1 Conceptual Site Model

The Conceptual Site Models (CSMs) for potential human exposure to MEC and MC at Fort Bliss are exhibited in Figures 2-2 and 2-3, respectively.

CSM for MEC: The CSM for MEC (Figure 2-2) considers exposure pathways via intrusive and non-intrusive activities at the site. The potential of creating an off-site explosive risk exposure pathway via leaching, surficial erosion, or other mechanism is considered minimal. The reduction of site access via physical and/or administrative methods proportionately reduces the exposure risk to MEC at the site. Elimination of access (as shown in the No Access box in Figure 2-2) eliminates the exposure risk.

CSM for MC: The CSM for MC (Figure 2-3) considers exposure pathways and receptors for MC at the MRS. LUCs would reduce or eliminate access to the site, and therefore reduce risk of direct contact with MC.

2.2.2 Risk Estimation

The potential risks at the site, particularly from MEC explosive hazards, are not quantified at this stage of the MMRP. Qualitative risk estimates were documented using the Military Response Site Prioritization Protocol (MRSPP) in the SI. The MRSPP implements the requirement established in Section 311(b) of the National Defense Authorization Act for Fiscal Year 2002 for the DoD to assign a relative priority for munitions responses to each location in the DoD's inventory of defense sites known or suspected of containing MEC or MC. The MRSPP Priority Rating is on a scale of 1 to 8, with 1 being the most hazardous. For sites that do not have a chemical warfare munitions hazard, the highest score is 2 (for explosive hazard or human health hazard).

The MRSPP estimate from the SI is used as an indicator of the relative risk at the Castner Range MRS at Fort Bliss.

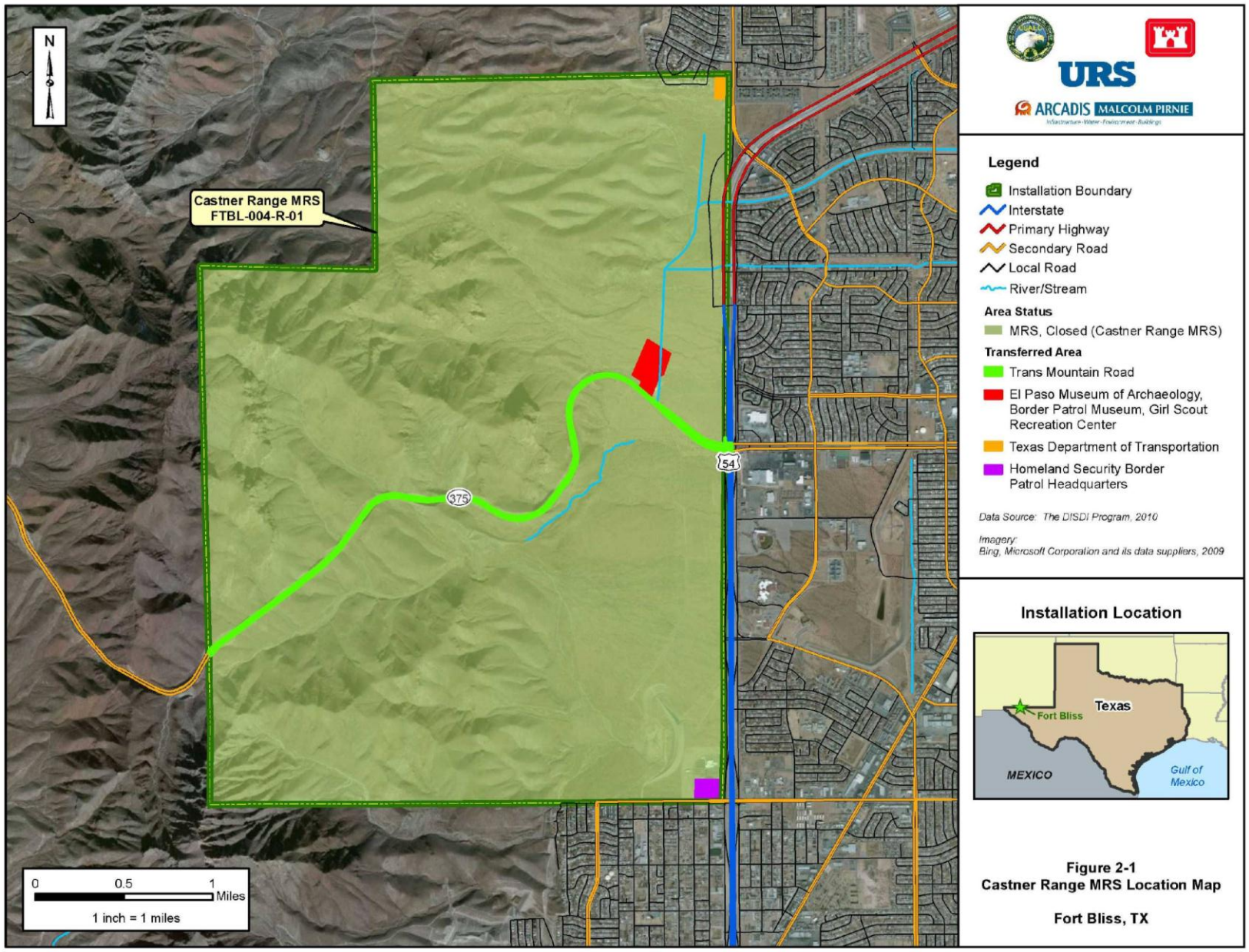

Figure 2-1
Castner Range MRS Location Map

Fort Bliss, TX

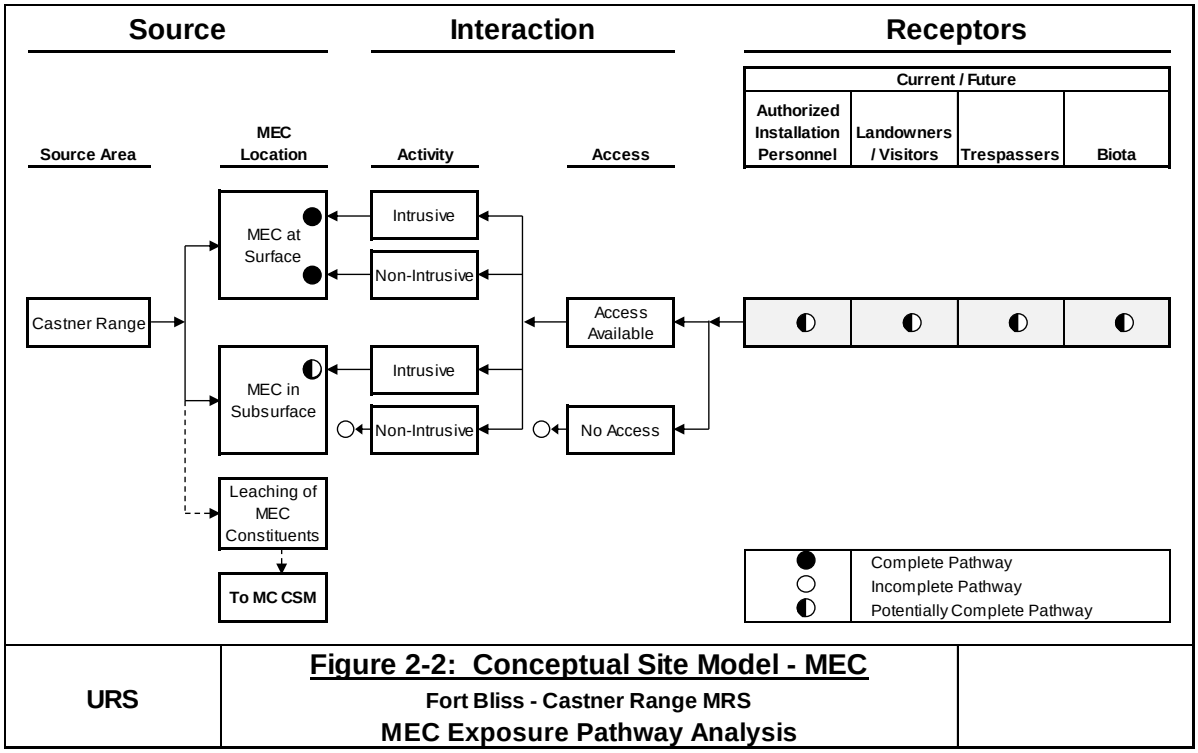

Figure 2-2: Conceptual Site Model - MEC

Fort Bliss - Castner Range MRS

MEC Exposure Pathway Analysis

URS

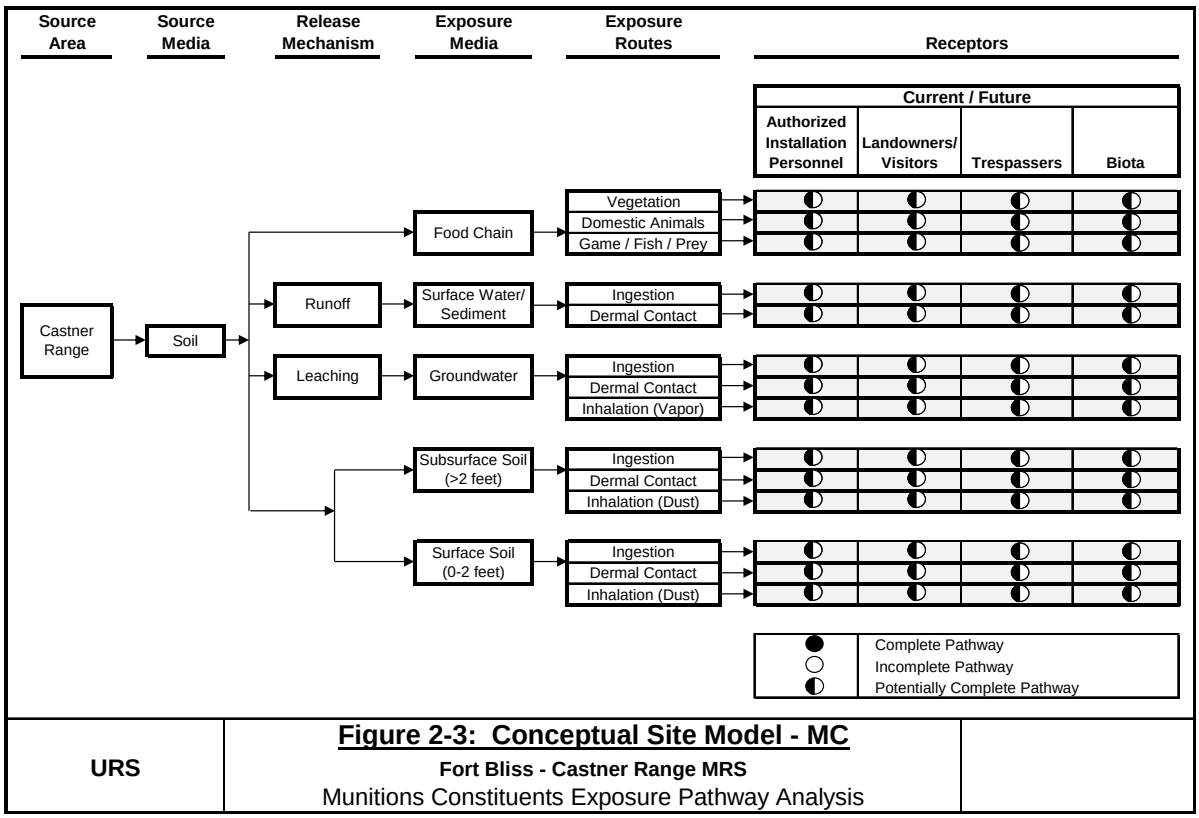

Figure 2-3: Conceptual Site Model - MC

Fort Bliss - Castner Range MRS

Munitions Constituents Exposure Pathway Analysis

URS

Table 2-1 shows the single on-post MRS under consideration in this EE/CA. This MRS is judged in comparison to other MRSs nationally using its MRSPP score as an indicator of relative risk.

Table 2-1: On-Post MRS Recommended for Further Action

			COCs Present			
MRS Name	**AEDB-R No.**	**Acres**	**MEC**	**MC**	**MRSPP Score**	**Existing LUCs?**
Castner Range	FTBL-004-R-01	7,007	Yes	Yes	3	Partial fences, signs, boulders blocking roads, limited patrolling.

AEDB-R - Army Environmental Database – Restoration
COCs – Constituents of Concern

3.0 IDENTIFICATION OF NTCRA LAND USE CONTROL OBJECTIVES

3.1 REMOVAL ACTION OBJECTIVE

The objective of the NTCRA LUCs is to protect human health by minimizing exposure to MEC and MC, including but not limited to the "threat of fire and explosion" (40 CFR 300.415(b)(2)(vi)), at the MRS while further response actions are evaluated and implemented. CERCLA standard language is for remedial actions to protect both human health and the environment, but a NTCRA LUC typically only protects human health.

3.2 RESIDUAL RISK MANAGEMENT

The NTCRA LUC is intended to reduce the probability of direct contact with MEC or MC, and will thus reduce the exposure and explosive risk to humans at the MRS.

No action will be taken with this NTCRA to remove or remediate the MEC and MC at Castner Range. Therefore, residual risk from the MEC and MC will remain. The LUCs alternative is an interim NTCRA, and is not intended to be permanent or to replace the need for the more permanent solutions developed under the MMRP. The final remedial action will be implemented after completion of the RI/FS, and may or may not include components similar to the NTCRA LUCs.

3.3 STATUTORY LIMITS ON NTCRA LAND USE CONTROLS

NTCRAs are conducted when a removal action is appropriate to reduce hazardous exposure, and when there will be at least six months (possibly up to several years) before on-site removal/abatement activities can begin, since NTCRAs can be established at a site more quickly than other CERCLA options. The NTCRA LUCs described here for the Castner Range MRS are interim (not final) actions.

The National Contingency Plan (NCP) §300.415 provides the regulatory framework for NTCRAs. Guidance documents include *Guidance on Conducting Non-Time-Critical Removal Actions under CERCLA* (USEPA, 1993a) and the fact sheet, *Conducting Non-Time-Critical Removal Actions under CERCLA* (USEPA 1993b).

NCP §300.415(b)(4) states that a removal action, with at least 6 months planning, requires preparing, with stakeholder involvement, an EE/CA and an AM, along with the required public involvement actions.

3.4 DETERMINATION OF NTCRA LAND USE CONTROL SCOPE

Only Army-owned MRSs that are recommended for further action beyond the SI phase are included in this project. Sites with a No Further Action recommendation and MRSs located off Army-owned land will not be addressed in this action. Privately owned MRSs are not being addressed by the NTCRA LUCs because the Army cannot apply controls to land it does not own without the owner's consent. Since the Castner Range MRS is owned by the Army, it will be addressed by the NTCRA LUCs.

3.5 REGULATORY/OTHER STAKEHOLDER CONCERNS

Fort Bliss has regulatory oversight from the USEPA and the TCEQ as described in Section 1.5, under the regulatory framework described in Section 1.1.

The primary regulatory and other stakeholder goals are to provide short- and medium-term protection of human health and the environment at the MRS. This will be accomplished by limiting access, which will minimize human and ecological exposure to MEC and MC at the site.

3.6 PLANNED REMEDIAL ACTIVITIES

This EE/CA is the first part of a series of actions intended to result in the implementation of NTCRA LUCs at Castner Range within one year.

The Final EE/CA will be presented to the public for input. Public participation will be sought with both a 30-day review and a public meeting (if requested during the comment period) in accordance with 40 CFR §300.415(n)(2).

An AM will follow the Final EE/CA and will document the selection and approval for the LUCs to be used at Castner Range. The public input on the Final EE/CA will be incorporated into the AM, in Section V "Proposed Actions and Estimated Costs" and in the attached responsiveness summary. The recommended outline for an AM is provided in Appendix C.

Once the AM is complete, a Land Use Control Plan (LUCP) will be finalized. A Draft Final LUCP has been prepared and will be revised to incorporate the findings of the EE/CA and AM. The LUCP explains the implementation and management of the LUCs at Castner Range. In addition to background information and site information, the LUCP presents (i) existing LUCs, (ii) zoning and land use restrictions, (iii) DoD and non-DoD agency responsibilities, (iv) documentation requirements, (v) LUC monitoring, management, and maintenance, and (vi) LUC funding.

4.0 IDENTIFICATION AND ANALYSIS OF NTCRA ALTERNATIVES

This EE/CA is focused on two alternatives (No Action and LUCs) for addressing the potential risks at the Castner Range MRS while the MMRP progresses and more permanent actions are investigated and implemented. Sections 4.1 and 4.2 describe the LUCs considered in this document, touch on their potential application to Fort Bliss, and evaluate the effectiveness of the various components. Section 4.3 presents the LUCs actually chosen for the installation.

4.1 ALTERNATIVE 1 - NO ACTION

A No Action alternative is retained as required by 40 CFR 300.430(e)(6). This alternative provides a baseline against which Alternative 2 – LUCs can be evaluated. Under the No Action alternative, no change in the baseline conditions would be implemented at an MRS.

For example, if no LUCs are currently in place, then no action of any kind, including LUC measures, reviews, or inspections, would be implemented at the MRS. Any MEC or MC would remain in place without protective barriers, warnings, or restrictions on use of the area. However, if LUCs are currently in place, then the LUCs will remain as established. The No Action alternative would, in this case, be evaluated based on no change to the existing condition (i.e., established LUCs). Since the LUC measures are already in place, the on-going reviews or inspections would be implemented as already planned with no change from what has already been budgeted or scheduled.

The No Action alternative has no implementation considerations because no actions would be taken that differ from the existing or baseline condition. As such, there are also no additional costs incurred with this alternative because there are no changes proposed. If there are no LUCs in place as the baseline condition, there are also no means to establish, evaluate, or confirm the No Action alternative's effectiveness in achieving the NTCRA objectives.

4.2 ALTERNATIVE 2 - LUCS

The LUCs alternative consists of the set of measures selected for each MRS at an installation, or grouping of similar MRSs, that reduce or eliminate potential risks. Standard installation-wide LUC components can be supplemented with MRS-specific measures, if necessary, to address the conditions at the individual sites. Since Fort Bliss has only one MRS, a single set of LUC components will be sufficient.

A description of the potential components and their application at Fort Bliss follows.

4.2.1 Identification and Screening of LUC Components

The term "LUCs" encompasses administrative, engineering and other methods to reduce or eliminate potential risks to human health. The AEDB-R has a list of possible LUCs that includes 22 institutional controls, 4 engineering controls, and 21 Land Use Restrictions (LURs). To identify appropriate LUCs for a specific installation, the list is narrowed down to include short-term NTCRA options to address on-post MRSs while more permanent actions are determined.

The LUC measures considered in this EE/CA are listed below and described in this section.

1. **Institutional Controls**
    a. Land Use Restrictions/Notations in Master Plan/Dig Permit
    b. Public Advisories [e.g., educational programs, public announcements, posted bulletins]
2. **Engineering Controls:**
    a. Markers or Signs
    b. Fences
    c. Guards
3. **Other Measures:**
    a. Periodic Inspections (i.e., Monitoring and Enforcement)
    b. Environmental Self-Audit

4.2.1.1 Institutional Controls: Land Use Restrictions, Notations in the Master Plan, and Dig Permits

The primary Institutional Control measure considered is the combination of Land Use Restrictions, Notations in the Master Plan, and Dig Permits. These three measures are dependent on one another and functionally grouped. Of these, the restrictions considered most likely to meet the on-post and NTCRA constraints at Fort Bliss are:

- **Restrict Land Use**
    - Mitigation area(s) protection
    - No daycare/hospital/school use[2]
    - No residential use without appropriate review of installation master plan and application of safety requirements, possibly including UXO construction support activities[2]
- **Media-Specific Restrictions**
    - Prohibit or otherwise manage excavation

Conditional restrictions will also likely be required at some MRSs, such as UXO clearance to a specified depth with any excavation, drilling, or disturbance of soil, or periodic surface clearance of the MRS if certain non-intrusive activities are allowed. All restrictions will require coordination with the installation Master Planner and other Army stakeholders. They must be approved by the Garrison Commander and IMCOM.

The Installation Master Plan is used for land use and construction project planning. Notations would be made in the Master Plan to identify the MRS boundaries and to document related LUC restrictions and zoning changes, if any. The Installation's Geographic Information System can be used to demarcate the MRSs and applicable LUCs.

LUCs are implemented through the master planning process at an installation, as described in Army Regulation (AR) 210-20, *Real Property Master Planning for Army Installations* (May 2005). The recommendations in the NTCRA are incorporated into the master planning process,

[2] If review of the existing Master Plan and any existing permit programs indicates that land use restrictions already exist, these can either be modified as necessary to include Castner Range for the appropriate time period, or can be left intact if they are already fully sufficient.

but by themselves do not establish the LUCs. Ultimately, the Garrison Commander and IMCOM will authorize the establishment of these LUCs.

Existing permit programs for the installation (such as dig permits, building permits, water/sewer connection permits, and excavation permitting systems) can be modified to include the prohibitions, restrictions or conditions established for MEC and MC at an MRS. These are often triggered by a DA Form 4283 (Facilities Engineering Work Request). The reviewing agencies for Fort Bliss will know of and convey to the applicants the LURs and LUCs at the site. In this way, the dig permits can be used to enforce prohibitions or notify construction crews of the potential risks and measures needed to mitigate risks.

To maintain a successful permit program, a system to verify compliance with the permit program and the authority to bring violators back into compliance is required. In the case of a MEC-contaminated site, a permit program can be established that requires UXO-qualified personnel to clear an area prior to excavation for footings or foundations.

4.2.1.2 Institutional Controls: Public Advisories

A variety of advisory, notification, or educational material could be used to alert the public of the potential risks at an MRS. These advisories may be helpful in alerting the public to safety consideration at the site, but repeated advisories may, with time, have diminishing effectiveness, desensitizing the public to the risks and control measures taken at the site.

It is thus recommended that the advisories be targeted to the groups affected by LUCs. For instance, advisory pamphlets could be provided to buildings and houses adjacent to an MRS, or to crews and individuals when they apply for dig permits or building permits in the vicinity of the MRS.

Fort Bliss will consider the use of advisories on a periodic basis to ensure that military and civilian personnel, as well as potential trespassers, are reminded of but not jaded to the potential presence of MEC and MC at Castner Range.

4.2.1.3 Engineering Controls: Signs and Markers, Fences, and Guards

Signs and markers can be used to warn people of the potential dangers of MEC and MC at the MRS. This may limit potential contact, but will do nothing to restrict contact by those who cannot read or choose to ignore the warnings. The costs for sign coverage are roughly proportional to the linear footage of the perimeter, so larger MRSs will require more signs. The generic estimate provided in Table 4-3 for sign installation is based on a square site covering 5 acres, with signs placed every 200 feet around the perimeter (approximately 1000 ft. at a 5-acre site).

A perimeter fence would be used to limit access to an MRS. For the NTCRA LUC, a medium-security, 5-foot high, industrial chain link fence (with 6-gauge galvanized steel wire, and no barbed wire at the top) is suggested. The cost of fence installation depends on the MRS site conditions and size. The generic example estimate provided in Table 4-3 is for a square site covering 5 acres, with costs roughly proportional to the linear footage (approximately 1000 ft.) of the perimeter.

The stationing of guards to limit or control access to an MRS is labor-intensive and costly. As a result, it would normally not be recommended as a NTCRA LUC. However, since Castner

Range is not contiguous with the rest of Fort Bliss and public access exists to areas such as the Trans Mountain Road and the Wilderness Museum, access is not restricted by guards at all entry points. Guards and Military Police at Fort Bliss include the Castner Range MRS in their post patrols, but patrols are conducted on an irregular basis. As a result, guards will be considered at Castner Range.

4.2.1.4 Other Measures: Periodic Inspections

The DoD Office of the Deputy Under Secretary of Defense (Environmental Security) (ODUSD(ES)) recommends the following:

- **"Inspections**: The inspection of LUCs should become part of existing inspections conducted at the installation. Depending on the type of LUCs, these inspections could include a visual check to ensure that proper maintenance of LUCs is taking place.
- **"Environmental Self-Audit**. Evaluating and verifying LUCs should be part of the Component's environmental audit and self-inspection program, and should be incorporated into the self-audit checklist and required report." (DoD, 2001a)

These inspections and environmental self-audits are estimated to cost $1,000 annually per MRS. These inspections are combined into a program of "Monitoring and Enforcement" under which an annual review of the MRSs will be conducted to ensure that LUCs remain effective and land usage has not changed.

4.2.2 Evaluation of Alternative 2 LUC Components

NTCRAs are evaluated on the basis of three of the NCP criteria: effectiveness, implementability, and cost. The following is a summary of each criteria as applied to the Castner Range MRS at Fort Bliss. MRS-specific adjustments are described in Section 4.3.

4.2.2.1 Effectiveness

Effectiveness is evaluated as both a short-term and long-term measure. Short-term effectiveness is defined by both the length of time needed until protection is in place and the impacts on human health after implementation. Long-term effectiveness concerns the ability of the alternative to reliably protect human health over time. Table 4-1 shows the general effectiveness ratings of the LUC components.

Table 4-1: Effectiveness of Alternative 2 LUC Components

	Short-Term Effectiveness		Long-Term Effectiveness		
LUC Component	**Time needed to reach full effectiveness**	**Construction impacts on human health**	**Reliable protection of human health**	**Reliable protection of environment(1)**	**Overall Rating**
1. Land Use Restrictions/ Notations in Master Plan/ Dig Permits	Immediate upon authorization	Not applicable	Yes to workers	No	◑
2. Public Advisories	> 1 month	Not applicable	Some	No	○
3. Signs and Markers	< 1 week	No	Some	No	◑
4. Fences	> 1 month	Some to workers	Yes	Some	●
5. Guards	> 1 month	No	Yes	No	◑
● Excellent ◑ Good ○ Average ⊗ Poor NA=Not Applicable TBD=To Be Determined					

(1) CERCLA standard language is for remedial actions to protect both human health and the environment, but a NTCRA LUC only protects human health.

4.2.2.2 Implementability

Implementability addresses the feasibility of implementing an alternative. It includes technical feasibility by screening out alternatives that clearly would be ineffective or unworkable at a site, and administrative feasibility, which reviews the ability to obtain permits, and the availability of necessary services, equipment, and skilled workers to implement the technology. All LUC components that passed the initial screening are considered technically feasible, so that factor is not shown here. Table 4-2 shows the general implementability ratings of the LUC components.

Table 4-2: Implementability of Alternative 2 - LUCs

	Administrative Feasibility		Overall Rating
LUC Component	**Ability to obtain permits**	**Availability of services, equipment, workers**	
1. Land Use Restrictions/ Notations in Master Plan/ Dig Permits	Yes	Not applicable	●
2. Public Advisories	Yes	Not applicable	●
3. Signs and Markers	Yes	Yes	●
4. Fences	Yes	Yes	◑
5. Guards	Yes	Good use of personnel?	○
● Excellent ◑ Good ○ Average ⊗ Poor NA=Not Applicable TBD=To Be Determined			

4.2.2.3 Cost

Cost estimates are reviewed as capital (first year) costs, operation and maintenance (O&M) costs, and net present value (NPV) costs.

Costs estimates were developed as shown in Appendix B. Table 4-3 provides generic costs for the variety of potential LUCs. The methodology for developing these costs is presented in Appendix B, and the results of calculations to determine MRS-specific costs are provided later in this document.

Table 4-3: Generic Summary of Alternative 2 - LUCs
(*costs are in $1,000s*)

LUC Component	Size Dependency	Capital Cost	Annual Operating Cost (1)	O&M Years	NPV (2)
• Land Use Restrictions/ Notations in Master Plan/ Dig Permits (3)	No	$ 43.3	$ 6.5	5	$ 67.6
• Public Advisories (3)	No	$ 6.8	$ 6.8	5	$ 32.0
• Signs and Markers	/linear feet of perimeter	$ 10.9	$ 0.1	5	$ 11.3
• Fences	/linear feet of perimeter	$ 56.1	$ 5.6	5	$ 77.1
• Guards	/installation	$ 261.8	$ 261.8	5	$1,240.9

Notes: (1) Annual costs include inspections and self-audits of the LUCs.
(2) A 5-year period with a 2.75% discount rate is used for economic projections.
(3) Institutional controls are not size dependent.

Two of the three engineering controls have costs that are size-dependent as discussed in Appendix B. The costs for signs and fences are roughly proportional to the linear feet of the perimeter, under the assumption that the MRS is square in shape. The costs for the other LUCs are independent (or minimally dependent) on MRS size.

4.3 INSTALLATION SPECIFIC LUCs

The appropriate combination of administrative and engineered LUCs is presented here for the Castner Range. Table 4-4 provides a summary of the recommended LUCs for Castner Range.

The LUC measure "Land Use Restrictions/Notations in Master Plan/Dig Permits" is appropriate for Castner Range. It incorporates measurable and actionable means to limit exposure to MEC and MC at the MRS at a relatively low cost. Advisories are also recommended, due to the proximity of the site to a highly populated area and frequent unauthorized use by civilians.

Signs are recommended for this MRS. Although some signs are already posted, a site of 7,007 acres should have at least 300 signs, and the SI indicates that there were only 187. The new signs should also be bilingual in English and Spanish.

Additional fences are recommended due to the risk posed to civilians who enter the site. The cost estimate for this engineering control is calculated based on the whole perimeter of the MRS in order to provide a maximum possible cost. However, targeted fencing may be a more effective application of funds than covering the whole MRS, as not all boundaries of the Castner

Range are equally susceptible to trespassers. The most efficient deployment of additional fences will focus on the MRS boundary locations where trespassers are most likely to attempt access.

Periodic guard patrols are also recommended for Castner Range. Trespassing is a common problem at this MRS. Limited presence of guards at peak times (e.g., weekends and holidays) and at specific locations where trespassing tends to occur (e.g., the museum area) would significantly reduce hazard by providing an additional deterrent to trespassing on the range. Although some periodic patrols are conducted by the Military Police who monitor the main body of the installation, they are irregular and do not currently provide the most effective timing or coverage for the MRS. The typical RACER model estimates the cost for full time coverage of one guard post (168 hours/ week). Since Castner Range will only require part-time guard coverage during peak periods for trespassing (weekends, holidays, etc.), the cost estimate has been scaled down to approximately one quarter of the full time coverage (resulting in 42 hours/week, or 21 hours/week for a two guard team).

Table 4-4: Components Chosen for Castner Range MRS

					LUC Components Needed?(1)					
MRS Name	**Acres**	**MEC Present?**	**MC Present?**	**MRSPP Score**	**LURs/Note in MP / Dig Permits**	**Advisories**	**Signs/ Markers**	**Fences**	**Guards**	**Comments**
Castner Range	7,007	Yes	Yes	3	Yes	Yes	Yes	Yes	Yes	Currently, limited fencing restricts access in areas of the MRS; irregular patrols monitor boundaries; boulders restrict vehicular access in some areas.

(1) Yes = LUC Component needed; Blank = LUC Component not needed

Table 4-5 summarizes LUCs Alternative components for Fort Bliss, and includes an estimate of the costs associated with each.

Table 4-5: Components and Cost Summary of LUCs Alternative at Fort Bliss
(*costs are in $1,000s*)

LUCs Alternative: Selected Components	LURs/ Notation in Master Plan / Dig Permits	Advisories	Signs/ Markers	Fences	Guards	Capital Cost	Annual Operating Cost [1]	O&M Years	Net Present Value [2]
Castner Range									
Institutional Controls	Y	Y				$ 50.0	$ 22.7	5	$ 134.8
Engineering Controls			Y	Y	Y	$ 2,624.8	$ 320.4	5	$ 3,822.8
Total						**$ 2,674.8**	**$ 343.1**	**5**	**$ 3,957.7**

Notes: (1) Annual costs include inspections and self-audits of the LUCs.
(2) A 5-year period with a 2.75% discount rate is used for economic projections.
(3) Institutional controls are not size dependent.

5.0 COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES

Alternative 1 - No Action and Alternative 2 - LUCs under consideration at Fort Bliss are evaluated according to the three CERCLA criteria used with NTCRAs: effectiveness, implementability, and cost.

5.1 EFFECTIVENESS

Effectiveness is evaluated as both a short-term and long-term measure. Short-term effectiveness is defined by both the length of time needed until protection is in place and the impacts on human health after implementation. Long-term effectiveness concerns the ability of the alternative to reliably protect human health over time. The effectiveness of each alternative is summarized in Table 5-1 below. The No Action alternative has a poor effectiveness rating due to its inability to achieve the NTCRA objectives with any reliability, while the LUCs alternative is rated above average (good) in its effectiveness.

Table 5-1: Comparison of Effectiveness between Alternatives

	Short-Term Effectiveness		Long-Term Effectiveness		Overall Rating
Alternative	**Time need to reach full effectiveness**	**Construction impacts on human health t**	**Reliable protection of human health**	**Reliable protection of environment(1)**	
1. No Action	Unknown	●	⊗	NA	⊗
2. LUCs alternative	Immediate upon authorization	◑	●	NA	◑

● Excellent ◑ Good ○ Average ⊗ Poor NA=Not Applicable TBD=To Be Determined

(1) CERCLA standard language is for remedial actions to protect both human health and the environment, but a NTCRA LUC only protects human health.

5.2 IMPLEMENTABILITY

Implementability addresses the feasibility of implementing an alternative. It includes technical feasibility by screening out alternatives that clearly would be ineffective or unworkable at a site, and administrative feasibility, which reviews the ability to obtain permits, and the availability of necessary services, equipment, and skilled workers to implement the technology. All LUCs that passed the initial screening are considered technically feasible, so that factor is not shown here. The No Action alternative has no technical or administrative feasibility considerations. The implementability of each alternative is summarize in Table 5-2 below.

Table 5-2: Comparison of Implementability between Alternatives

	Administrative Feasibility		Overall Rating
Alternative	**Ability to obtain permits**	**Availability of services, equipment, workers**	
1. No Action	NA	NA	●
2. LUCs Alternative	●	◑	●

● Excellent ◑ Good ○ Average ⊗ Poor NA=Not Applicable TBD=To Be Determined

5.3 COST

Cost estimates are reviewed as capital (first year) costs, O&M costs, and NPV costs.

Costs estimates were developed as shown in Appendix B. The cost summary for the alternatives is shown in Table 5-3. While the No Action alternative has no associated costs and thus is least expensive, implementing LUCs is a reasonably priced alternative at $3,957,678 over a 5-year duration.

Table 5-3: Cost Summary of Alternatives
(*costs are in $1,000s*)

Alternative	Size Dependency	Capital Cost	Annual Operating Cost (1)	O&M Years	NPV (2)
1. No Action Alternative	No	$ 0	$ 0	NA	$ 0
2. LUCs Alternative	Partial	$2,674.8	$ 343.1	5	$3,957.7

Notes: (1) Annual costs include inspections and audits of the LUCs.
(2) A 5-year period with a 2.75% discount rate is used for economic projections.

6.0 RECOMMENDED NTCRA ALTERNATIVE

Two NTCRA alternatives were evaluated for their ability to meet the removal action objective of protection of human health at the on-post MRS for Fort Bliss.

- **Alternative 1 - No Action**: This alternative represents the baseline (current) conditions with no additional restrictions or protective measures.
- **Alternative 2 - LUCs**: This alternative includes a combination of institutional controls (land use restrictions, notation in the Installation Master Plan, and dig permits), and engineering controls (additional signs, fences, and guards) at the Castner Range MRS.

The No Action alternative does not meet the removal action objective and provides no means of protecting human health.

The LUCs alternative is effective and implementable. It meets the removal action objective and helps protect human health by limiting exposure to MEC and MC at Castner Range. Because MEC and MC remain on site, risks will remain at the MRS; however, risk of hazardous exposure will be reduced through LUCs. Therefore, Alternative 2 (LUCs) is recommended for implementation at Fort Bliss.

APPENDICES

Appendix A References
Appendix B Cost Breakdowns and Assumptions
Appendix C Action Memorandum Outline

APPENDIX A

REFERENCES

APPENDIX A: REFERENCES

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APPENDIX B

Cost Breakdowns and Assumptions

LUC Component Costs are shown for the following NTCRA LUC components which were developed using RACER (Version 10.3.0).

Appendix B.1: Institutional Controls

- Notations in Master Plan
- Dig Permits
- Public Advisories
- Monitoring and Enforcement

Appendix B.2: Engineering Controls

- Fences
- Signs
- Guards

Appendix B.3: Example of Net Present Value Example Calculation

Appendix B.4: LUC Components and NPV Calculations – Castner Range

APPENDIX B: COST BREAKDOWNS AND ASSUMPTIONS FOR ALTERNATIVE 2 - LUCS

B.1: RACER Institutional Controls

Notations in Master Plan

RACER Administrative Land Use Control Technology
Implementation Tab

Assumptions/RACER Selections

Based on Modify Installation Master Plan task
Low Complexity
US location multiplier (1.0) (average costs for US as a whole)
Active Government Installation selected on Systems Definition Tab

	First Year	Annual
Cost ** =	**$36,695**	**$0**

Dig Permits

RACER Administrative Land Use Control Technology
Monitoring and Enforcement Tab

Assumptions/RACER Selections

Based on Notice Letter task
2 permits issued each year
US location multiplier (1.0) (average costs for US as a whole)
Active Government Installation selected on Systems Definition Tab

	First Year	Annual
Cost ** =	**$6,530**	**$6,530**

Public Advisories

RACER Administrative Land Use Control Technology
Monitoring and Enforcement Tab

Assumptions/RACER Selections

Based on Notice Letter task
10 letters sent each year
US location multiplier (1.0) (average costs for US as a whole)
Active Government Installation selected on Systems Definition Tab

	First Year	Annual
Cost ** =	**$6,757**	**$6,757**

Monitoring and Enforcement

RACER Administrative Land Use Control Technology

Monitoring and Enforcement Tab

Assumptions/RACER Selections

Based on Site Visit/Inspections task

1 Inspection, safety level D (default), 1 day, 2 people, no airfare, no mileage
US location multiplier (1.0) (average costs for US as a whole)
Active Government Installation selected on Systems Definition Tab

	First Year	Annual
Cost ** =	**$0**	**$9,404**

Notes * RACER Version 10.3.0
**costs include material, labor, and equipment and markup

B.2: RACER Engineering Controls *

Fences and Signs

RACER technology used: Fencing

Assumptions/RACER selections

Linear feet (LF) of fencing assumes the site is square
Boundary fence type (5 foot high, galvanized chain link)
US location multiplier (1.0) (average costs for US as a whole)
Signs are placed on perimeter of site, approximately every 200 feet
Costs shown are first year costs. Assume 10%/year annual upkeep costs.

RACER Fencing Technology

Acres	LF	Fence Cost**	# Signs	Sign Cost**	Total Cost**
1	835	$ 25,104	5	$ 466	$ 25,570
2	1,181	$ 35,502	6	$ 559	$ 36,061
3	1,446	$ 43,481	8	$ 746	$ 44,226
4	1,670	$ 50,207	9	$ 839	$ 51,046
5	1,867	$ 56,134	10	$ 932	$ 57,066
10	2,640	$ 79,385	14	$ 1,305	$ 80,690
20	3,734	$ 112,267	19	$ 1,771	$ 114,038
30	4,573	$ 137,499	23	$ 2,144	$ 139,642
40	5,280	$ 158,770	27	$ 2,516	$ 161,286
50	5,903	$ 177,510	30	$ 2,796	$ 180,306
100	8,348	$ 251,037	42	$ 3,914	$ 254,951
200	11,806	$ 355,020	60	$ 5,592	$ 360,612
300	14,460	$ 434,808	73	$ 6,804	$ 441,612
400	16,697	$ 502,074	84	$ 7,829	$ 509,902
500	18,668	$ 561,335	94	$ 8,761	$ 570,096
1000	26,400	$ 793,848	132	$ 12,302	$ 806,150
2000	37,335	$ 1,122,671	187	$ 17,428	$ 1,140,099
3000	45,726	$ 1,374,985	229	$ 21,343	$ 1,396,328
4000	52,800	$ 1,587,696	264	$ 24,605	$ 1,612,301
5000	59,032	$ 1,775,098	296	$ 27,587	$ 1,802,685
10000	83,484	$ 2,510,368	418	$ 38,958	$ 2,549,325
20000	118,064	$ 3,550,196	591	$ 55,081	$ 3,605,277

Guards

RACER Administrative Land Use Control Technology
Monitoring and Enforcement Tab

Assumptions/RACER selections

24/7 Coverage at one guard post = 168 hr/wk
Hourly rate = $30 (includes RACER markup)
US location multiplier (1.0) (average costs for US as a whole)

	First Year	Annual
Cost ** =	**$261,818**	**$261,818**

Notes: * RACER Version 10.3.0
**costs include material, labor, and equipment and markup

B.3: Net Present Value Example

(Used in generic summary of Alternative 2 costs, Section 4.2.2.3)

Inputs and Assumptions	
Site Size (acres)	5
First Year	2012
Years NTCRA LUCs required	5
Annual O&M Eng. Controls	10%
i =	2.75%

NTCRA LUC Costs	Unit	1st Year Cost	Annual Cost	Years Required	Total	NPV
Institutional Controls						
Restrictions on land use / Notations in Master Plan	/installation or major group	$ 36,695	$ -	5	$ 36,695	$ 36,695
Dig Permits	/installation or major group	$ 6,530	$ 6,530	5	$ 32,650	$ 30,949
Public Advisories	/installation or major group	$ 6,757	$ 6,757	5	$ 33,785	$ 32,024
Monitoring and Enforcement	/installation or major group	$ -	$ 9,404	5	$ 37,616	$ 35,166
Engineering Controls						
Signs	/5-acre site	$ 10,932	$ 93	5	$ 11,305	$ 11,281
Fence	/5-acre site	$ 56,134	$ 5,613	5	$ 78,587	$ 77,124
Guards	/installation or major group	$ 261,818	$ 261,818	5	$ 1,309,090	$ 1,240,868

NPV Calculations		2012	2013	2014	2015	2016	2017
	LUC Required?	*TRUE*	*TRUE*	*TRUE*	*TRUE*	*TRUE*	*FALSE*
Institutional Controls	**NPV**			**Annual Cost**			
Restrictions on land use / Notations in Master Plan	$ 36,695	$ 36,695	$ -	$ -	$ -	$ -	$ -
Dig Permits	$ 30,949	$ 6,530	$ 6,530	$ 6,530	$ 6,530	$ 6,530	$ -
Public Advisories	$ 32,024	$ 6,757	$ 6,757	$ 6,757	$ 6,757	$ 6,757	$ -
Monitoring and Enforcement	$ 35,166	$ -	$ 9,404	$ 9,404	$ 9,404	$ 9,404	$ -
Engineering Controls	**NPV**			**Annual Cost**			
Signs	$ 11,281	$ 10,932	$ 93	$ 93	$ 93	$ 93	$ -
Fence	$ 77,124	$ 56,134	$ 5,613	$ 5,613	$ 5,613	$ 5,613	$ -
Guards	$ 1,240,868	$ 261,818	$ 261,818	$ 261,818	$ 261,818	$ 261,818	$ -

Notes: (1) Sign costs include $10,000 design costs plus $93.2/sign produced.

B.4: LUC Components and NPV Calculations – Fort Bliss

Inputs and Assumptions	
Site Size (acres)	7,007
Perimeter (ft.)	69883
First Year	2012
Years NTCRA LUCs required	5
Annual O&M Eng. Controls	10%
i =	2.75%

NTCRA LUC Costs	Units	1st Year Cost	Annual Cost	Years Required	Total	NPV
Institutional Controls						
Restrictions on land use / Notations in Master Plan	Lump sum	$ 36,695	$ -	5	$ 36,695	$ 36,695
Dig Permits	Lump sum	$ 6,530	$ 6,530	5	$ 32,650	$ 30,949
Public Advisories	Lump sum	$ 6,757	$ 6,757	5	$ 33,785	$ 32,024
Monitoring and Enforcement	Lump sum	$ -	$ 9,404	5	$ 37,616	$ 35,166
		$ 49,982	**$ 22,691**		**$ 140,746**	**$ 134,833**
Engineering Controls						
Signs	/10,000-acre site	$ 48,958	$ 3,896	5	$ 64,541	$ 63,526
Fence	/10,000-acre site	$ 2,510,368	$ 251,036.78	5	$ 3,514,515	$ 3,449,102
Guards	/installation	$ 65,455	$ 65,455	5	$ 327,273	$ 310,217
		$ 2,624,780	**$ 320,387**		**$ 3,906,328**	**$ 3,822,844**
All LUCs - Fort Bliss		**$ 2,674,762**	**$ 343,078**		**$ 4,047,074**	**$ 3,957,678**

NPV Calculations		LUC Required?	2012	2013	2014	2015	2016	2017	2018	2019
			TRUE	TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE
Institutional Controls	**NPV**					**Annual Cost**				
Restrictions on land use / Notations in Master Plan	$ 36,695		$ 36,695	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Dig Permits	$ 30,949		$ 6,530	$ 6,530	$ 6,530	$ 6,530	$ 6,530	$ -	$ -	$ -
Public Advisories	$ 32,024		$ 6,757	$ 6,757	$ 6,757	$ 6,757	$ 6,757	$ -	$ -	$ -
Monitoring and Enforcement	$ 35,166		$ -	$ 9,404	$ 9,404	$ 9,404	$ 9,404	$ -	$ -	$ -
Engineering Controls	**NPV**					**Annual Cost**				
Signs	$ 63,526		$ 48,958	$ 3,896	$ 3,896	$ 3,896	$ 3,896	$ -	$ -	$ -
Fence	$ 3,449,102		$ 2,510,368	$ 251,037	$ 251,037	$ 251,037	$ 251,037	$ -	$ -	$ -
Guards	$ 310,217		$ 65,455	$ 65,455	$ 65,455	$ 65,455	$ 65,455	$ -	$ -	$ -

Notes: (1) Sign costs include $10,000 design costs plus $93.2/sign produced.
(2) Guard estimate is adjusted to cover a quarter of the time (42 hrs/wk) typically used in the RACER model (168 hrs/wk).

Appendix C

Action Memorandum Outline

APPENDIX C: ACTION MEMORANDUM OUTLINE

USEPA recommends the following basic Action Memorandum outline

Heading

I. Purpose

II. Site Conditions and Background

- A. Site Description
  1. Removal site evaluation
  2. Physical location
  3. Site characteristics
  4. Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant
  5. NPL status
  6. Maps pictures, and other graphic representations
- B. Other Actions to Date
  1. Previous actions
  2. Current actions
- C. State and Local Authorities' Role
  1. State and local actions to date
  2. Potential for continued State/local response

III. Threats to Public Health or Welfare or the Environment and Statutory and Regulatory Authorities

IV. Endangerment Determination

V. Proposed Actions and Estimated Costs

- A. Proposed Actions
  1. Proposed action description
  2. Contribution to remedial performance
  3. Engineering Evaluation/Cost Analysis (for non-time critical actions only)
  4. Applicable or relevant and appropriate requirements
  5. Project schedule
- B. Estimated Costs

VI. Expected Change in the Situation Should Action Be Delayed or Not Taken

VII. Outstanding Policy Issues

VIII. Recommendation

Attachment: Responsiveness Summary to Final EE/CA Report